# A Medical Information Resource Server: One Stop Shopping on the Internet

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## THE PROBLEM OF RESOURCE ACCESS

For more than a decade now many medical information resources have been available to the researcher, practitioner, and student. Nevertheless use has generally been less than envisioned. We suggest that access has been impeded by a lack of standardization in the methods of resource access. If busy users have to learn different vocabularies, different styles and details of querying a resource, and different output formats, then they are discouraged from exploration and discovery, and may fail to recognize the applicability or utility of extant medical resources. Yet another deterrent, caused by lack of integration, is the frequently imposed requirement to interrupt current work to use an information resource.

With ever-increasing geographic spread and use of the Internet to provide high-speed connections to all kinds of information sources, various standards for browsing and interactive querying have emerged. The widespread distribution and rapid acceptance of the University of Minnesota Gopher protocol, its simple nature, modest system requirements, and the free availability of clients for diverse platforms have made it a reasonable standard to target for delivery of resources in general. We will demonstrate how it is useful for medical resources in particular.

## THE PROMISE OF FAST, EASY ACCESS

We have developed, and are expanding and evaluating, a Gopher server that can respond quickly to queries to provide biomedical term definitions, medical care guidelines, disease characterization summaries, review article citations and abstracts, and cancer evaluation and treatment reviews. All the information comes from currently available electronic medical information resources: AHCPR Guidelines, DXplain, PDQ, UMLS Metathesaurus, and MEDLINE.

With this approach we hope to satisfy the need for truly unimpeded access to a few useful medical resources. Users can access, at least in part, much of the information directly from standard clients, such as Gopher or Mosaic. Developers can use the simple Gopher protocol to embed query ability into their applications. We have implemented this in our developing Student and Clinicians' Workstations, and the Decision Systems Group at Brigham and Women's Hospital has incorporated the ability to query our server in a demonstration radiology system.

## ACCESS OVERVIEW

The usual method of interaction with the server is to first match a user's text string to the National Library of Medicine's (NLM) Unified Medical Language System (UMLS) Metathesaurus (Meta). This is a very large thesaurus of terms from many medical vocabularies; the UMLS also provides semantic relationships between terms. The server returns concepts that are matched and also identifies resources which could provide further information about those concepts. Additions to our local copy of Meta allow uniform use of other resources pointers.

The interaction is iterative: the user may select an offered resource and query our server again. By a variety of techniques, involving both queries to local databases and further queries over the Internet to remote resources, the information is captured and returned to the user, still using the Gopher protocol. Thus users can enjoy a uniform interface to access disparate resources, and developers can benefit from a common and simple programming interface to provide this capability from within their own applications.

## REFERENCES AND ACKNOWLEDGMENTS

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AHCPR, DXplain, PDQ, MEDLINE, and Metathesaurus are trademarked.